What is claimed is:

1. An optical recording medium drive servo system of an optical recording/reproducing apparatus having a head, the system comprising:

an actuator moving a position of the head for recording data on a recording medium or reproducing the recorded data from the recording medium;

an error detector detecting a position error comprising a difference between a reference position on the recording medium and an actual position of the head ;

a compensator receiving the position error from the error detector and producing a value therefrom to drive the actuator;

a first memory storing control inputs for compensating for the position error of the actuator due to a disturbance ;

a second memory converting the control inputs of the first memory according to a phase and storing converted control inputs;

a timing controller generating addresses for the first memory and the second memory according to the phase; and

an adder adding the control inputs of the first memory or the converted control inputs of the second memory to the driving value from the compensator and providing a resulting sum to the actuator to compensate for the disturbance.

2. The optical recording medium drive servo system as recited in claim 1, wherein the first memory stores the control inputs to compensate for the position error generated during a predetermined rotation period of time through repeated operations of updating the control inputs stored in the first memory unit with a sum of a position error filtered value and a filtered value of the control inputs stored in the first memory unit, the operations being repeated until the position error is at or below a predetermined value.

3. The optical recording medium drive servo system as recited in claim 2, further comprising:

a first filter filtering the position error value; and

a second filter filtering the control inputs stored in the first memory, wherein a filtering coefficient is determined for the first and second filters, so that the sum is converged as a number of repetitions of the operations increases.

4. The optical recording medium drive servo system as recited in claim 1, wherein the timing controller generates an address for the first memory corresponding to a number of samples of position errors generated during one rotation cycle using a frequency generator pulse (FG) of a spindle motor for rotating the recording medium for the first memory and generates an address for the second memory corresponding to a number of rising edges and falling edges of the FG generated during the one rotation cycle .

5. The optical recording medium drive servo system as recited in claim 1, further comprising an interpolator interpolating the control inputs stored in the addresses of the second memory before the control inputs of the second memory is applied to the adder .

6. The optical recording medium drive servo system as recited in claim 5, further comprising a multiplexer outputting the control inputs of the first memory to the adder during a process in which the control inputs are stored in the first memory until position errors are converged to a predetermined value, and outputting interpolated control inputs from the interpolator after the process.

7. The optical recording medium drive servo system as recited in claim 1, wherein the disturbance is eccentricity.

8. A disturbance compensation module using learning control, for generating a control input to compensate for track position errors due to a periodic disturbance occurring in an optical recording medium in an optical recording medium drive servo system of an optical recording/reproducing apparatus, the module comprising:

a first filter filtering the track position errors;

a memory storing control inputs for compensating for a track control cycle in a corresponding address, wherein the memory comprises addresses, a number of which corresponds to a number of samples of the track position errors;

a second filter filtering the control inputs stored in the memory; and

an adder adding the filtered track position errors from the first filter to the filtered control inputs from the second filter and outputting a result of the addition to the memory, updating the control inputs to compensate for the track control cycle.

9. The disturbance compensation module as recited in claim 8, wherein the control inputs previously stored in the memory are updated with the result from the adder until the track position error is at or below a predetermined value.

10. The disturbance compensation module as recited in claim 8, further comprising:

a second memory storing final control inputs for compensating for the track control cycle in response to a pulse edge timing generated during a one track control cycle ; and

an interpolator interpolating the final control inputs stored in the second memory,

wherein a track position control is made using the interpolated final control inputs to control the tracks on the optical recording medium .

11. The disturbance compensation module as recited in claim 8, wherein filter coefficients for the first and second filters are determined so that the track position errors and the control inputs are converged as a frequency of learning increases.

12. The disturbance compensation module as recited in claim 10, further comprising:

a multiplexer multiplexing the control inputs stored in the memory and the interpolated final control inputs for a track position control on the optical recording medium after the learning control is complete.

13. The disturbance compensation module as recited in claim 8, wherein the disturbance is eccentricity.

14. A disturbance compensation module using learning control, for generating a control input to compensate for track position errors due to a periodic disturbance occurring in an optical recording medium in an optical recording medium drive servo system of an optical recording/reproducing apparatus, the module comprising:

a first filter filtering the track position errors;

a first memory comprising addresses, the number of which corresponds to a number of samples of the track position errors, and storing control inputs for compensating for a track control cycle in the addresses;

a second filter filtering the control inputs stored in the memory;

an adder adding the filtered track position errors from the first filter to the filtered control inputs from the second filter and outputting a result of the addition to the first memory;

a second memory storing final control inputs for compensating for the track position errors in response to a pulse edge timing generated during a one track control cycle ; and

an interpolator interpolating the final control inputs stored in the second memory,

wherein the control inputs previously stored in the first memory are updated with the result from the adder until the track position error is at or below a predetermined value, and a track position control is made using the interpolated final control inputs to control tracks on the optical recording medium .

15. The disturbance compensation module as recited in claim 14, wherein filter coefficients of the first and second filters are determined so that the track position errors and control inputs are converged as a frequency of learning increases.

16. The disturbance compensation module as recited in claim 14, further comprising a multiplexer multiplexing the control inputs stored in the first memory to obtain an error-compensation control input value during the one track control cycle and the interpolated final control inputs from the interpolator after all control inputs for disturbance compensation during the track control cycle are obtained and stored in the first memory.

17. A disturbance compensation method using learning control generating a control input for compensating for track position errors due to a periodic disturbance occurring on an optical recording medium, the method comprising:

determining whether a control input for disturbance compensation is required;

obtaining a feed-forward control input to compensate for a track control cycle on the optical recording medium determined when the control input is determined to be required;

converting the feed-forward control input into the control input depending on a phase of a track driving spindle and storing the converted control input value; and

compensating for the track position errors generated due to the disturbance using the converted control input .

18. The disturbance compensation method as recited in claim 17, further comprising:

determining that a disturbance compensation control input is required when a magnitude of the track position error is equal to or greater than a predetermined value, wherein the track position errors on the optical recording medium is measured prior to controlling tracking in the optical recording medium are measured equal to or greater than a predetermined value, it is determined that a disturbance compensation control input is required].

19. The disturbance compensation method as recited in claim 17, wherein a control process is one rotation of a track on the optical recording medium and when a k-th attempted control input result is $u_k(t)$ and the track position error measured is $e_k(t)$, a (k+1)th attempted control input result $u_{k+1}(t)$ is calculated using a following equation :

$$U_{k+1}(s) = P(s)U_k(s) + Q(s)E_k(s)$$

wherein $U_{k+1}(s)$, $U_k(s)$ and $E_k(s)$ denote Laplace transforms of $u_{k+1}(t)$, $u_k(t)$ and $e_k(t)$, respectively, and P(s) and Q(s) denote functions representative of a predetermined filter characteristic determined so that $U_{k+1}(s)$ is converged, and a final periodic feed-forward control input is obtained by repetitive operations of the equation.

20. The disturbance compensation method as recited in claim 19, wherein the feed-forward control input is adapted to compensate for the track position errors, until the final feed-forward control input is obtained, and the control input converted according to the phase is adapted to compensate for the track position error after the final feed-forward control input generated during the track control cycle is obtained.

21. The disturbance compensation method as recited in claim 17, further comprising interpolating the stored values and outputting the interpolated values to a disturbance compensation control input.

22. A method for an optical recording medium drive servo system of an optical recording/reproducing apparatus having a head, the method comprising:

moving a position of the head for recording data on a recording medium or reproducing the recorded data from the recording medium;

detecting a position error comprising a difference between a reference position on the recording medium and an actual position of the head;

receiving the position error and producing a value therefrom to drive a disk drive system;

storing control inputs to compensate for the position error due to a disturbance;

converting the control inputs stored according to a phase and storing converted control inputs;

generating addresses for the control inputs stored and the converted control inputs according to the phase; and

adding the control inputs stored or the converted control inputs to the value to drive the disk drive and providing a resulting sum to the disk drive system to compensate for the disturbance.

23. The method as recited in claim 22, further comprising:

storing the control inputs to compensate for the position error generated during a predetermined rotation period of time through repeated operations of updating the control inputs stored with a sum of a position error filtered value and a filtered value of the control inputs stored, the operations being repeated until the position error is at or below a predetermined value.

24. The method as recited in claim 22, further comprising:

generating a first address for the control inputs stored corresponding to a number of samples of position errors generated during one rotation cycle using a frequency generator pulse (FG) of a spindle motor for rotating the recording medium; and

generating a second address for the converted control inputs corresponding to a number of rising edges and falling edges of the FG generated during one rotation cycle.

25. The method as recited in claim 22, further comprising:

interpolating the control inputs stored in the first and second addresses before the converted control inputs are added.

26. A method for generating a control input to compensate for track position errors due to a periodic disturbance occurring in an optical recording medium in an optical recording medium drive servo system of an optical recording/reproducing apparatus, the method comprising:

filtering the track position errors;

storing control inputs for compensating for a track control cycle in a corresponding address and storing addresses, a number of which corresponds to a number of samples of the track position errors;

filtering the control inputs stored;

adding the filtered track position errors to the filtered control inputs; and

outputting a result of the addition to update the control inputs to compensate for the track control cycle.

27. The method as recited in claim 26, wherein the control inputs previously stored are updated with the result of the addition until the track position error is at or below a predetermined value.

28. The method as recited in claim 26, further comprising:

storing final control inputs for compensating for the track control cycle in response to a pulse edge timing generated during a one track control cycle; and

interpolating the final control inputs stored,

wherein a track position control is made using the interpolated final control inputs to control tracks on the optical recording medium.

29. The method as recited in claim 28, further comprising:

multiplexing the control inputs stored and the interpolated final control inputs for a track position control on the optical recording medium after the learning control is complete.